The Development Of A Validated Test To Assess The Temperament Of Dogs In A Rescue Shelter

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Introduction

This study describes the development of a standardised, validated and workable sequence of behavioural temperament tests for assessing dogs in rescue shelters. This aims to provide valuable information about the temperament of dogs before they are re-homed.

The large numbers of dogs which enter rescue homes attest to the many owner-dog relationships which fail. The analysis of dog acceptance records at one rescue shelter revealed that, of the owners that admitted their dogs, 25.6% cited behavioural problems as the reason. The most frequent types of problem were boisterousness (10%), aggression towards other dogs (9%), and aggression towards people (7.7%). Of the dogs homed, 17.4% were returned to the rescue centre. The proportion of dogs returned because of behavioural problems had risen to 69.2%. Boisterousness was cited in 16.9%, aggression towards dogs in 7.7% and aggression towards people in 19.2% of cases (Ledger & Baxter,1996). These statistics reveal which behavioural problems are responsible for the most failed relationships although they do not necessarily reflect the prevalence of problems in a population. In all, 20 types of behavioural problem were described by dog owners. This survey has enabled the development of a dog temperament test which sets out to predict the most prevalent problems. This facilitates the development of a streamlined and, therefore, more efficient temperament test.

Figure 1. represents the factors which lead to the development of behavioural problems in dogs, and how it may lead to the eventual abandonment of dogs at rescue shelters.

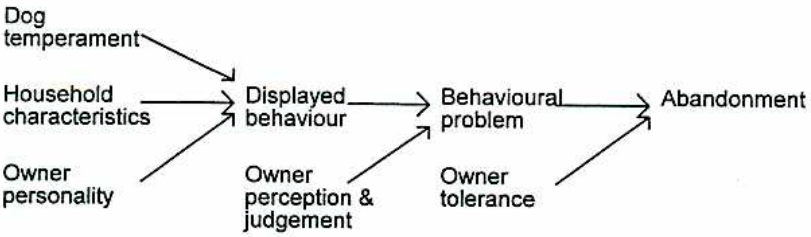

Figure 1. Steps leading to the abandonment of a dog at a rescue centre.

Many studies have identified that there is both a genetic and experience basis to the behaviour of dogs. The selection of dogs for distinct temperament types has lead to distinct temperament types between dog breeds, and even between strains within breeds. However, the degree of social contact and stimulation that puppies receive can also have a pronounced effect on their later behaviour. After this sensitive period temperament becomes far more rigid and stable. Therefore the development of this temperament test has focused on the

prediction of adult behaviour.(dogs of at least 5 months of age), whose temperament is less likely to change.More recently studies have attempted to elucidate the effect of owner personality on the behaviour of their dogs. For example, dogs belonging to owners who want a loving, dependant relationship, are more likely to show dominance aggression toward their owners (O'Farrell, 1991). But, a particular behaviour will only be displayed if the eliciting stimulus is present , represented by household characteristics in figure1. For example, a dog which has a great propensity to chase cats will only demonstrate that behaviour if a cat is present. It has also been demonstrated that the same kinds of dog behaviour may be judged differently by different owners (Ledger and Baxter,1997). There are obviously many factors which can effect the types of behaviour that are displayed by dogs in their new homes. However, in this study we have attempted to predict the propensity with which the dog is likely to display a particular behaviour in its new home, through an understanding of the underlying temperament of the dog.

In order to develop a useful temperament test for dogs, a factor analysis approach has been adopted. This assumes that temperament is divisible into traits. Traits are correlates of internal factors which cause consistant individual differences in behaviour (Eysenck, 1994) and individuals differ in the extent to which they possess a trait. The statistical technique, factor analysis, identifies consistently correlated patterns within data. When applied to personality, it identifies the structure of personality by assessing the patterns of inter-test correlation of subjects' performances in a series of test situations. It is assumed that tests which correlate highly with each other are measuring approximately the same trait. This technique has previously been used to investigate the structure of human and dog personality, but has not been utilized in the development of a temperament test for dogs.

Subjects

Subjects tested were 56 dogs kennelled at an RSPCA rescue shelter. Dogs were of various breeds and ages ranging from 5 months to 10 years. All dogs had been brought to the RSPCA by owners, none were strays. 40 of these dogs were eventually homed. Dogs had been admitted for behavioural and non-behavioural reasons. All dogs were behaviourally tested on the day following admittance. All dogs were housed singly.

Method

A large array of existing dog temperament tests were reviewed. A series of tests were selected and new tests designed, which aimed to elicit behavioural responses associated with the common behavioural problems identified above. Tests attempted to cause minimal stress and injury to both test dog and tester. They were straightforward and required only common equipment, to ,ensure that the tests would be transferable for use by kennel staff in the future.

The responses of dogs to 26 behavioural tests were observed. The tests were performed by one female tester (RL) at the rescue centre where the dogs were kennelled. Tests 1 to 10 were carried out in the dog's kennel. Tests 11 to 18 were conducted outside in a large grassed play area at the same site. The final tests, 19 to 26 were carried out back in the dogs kennel. An array of 43 different behaviours were recorded during each test. The tests were carried out on one subject at a time with each dog taking approximately one hour to assess.The behavioural responses to each test were dictated by the tester into a Dictiphone as they were observed, and the data coded back at the laboratory, as frequency data.

For any temperament test to be used reliably it is vital that it undergoes objective validation. Consequently, a questionnaire was developed to obtain accurate and reliable behavioural assessments of dogs from their new owners. It contained 80 questions in 6 sections. Each section was concerned with a different type of behaviour and listed an

extensive list of the situations in which a behaviour may be elicited and in which the most common behavioural problems were reported to arise. This was given to new dog owners two and six weeks after adoption. A total of 130 questionnaires were completed by new dog owners at the shelter and analysed. Using the questionnaire, the owner objectively rated the behavioural responses of their dog to a variety of situations, using a 5 point Lickert scale. This scale described overt behaviours and attempted to eliminate subjective inferences by the owner. Situations which had not been encountered were entered as a null response. Principal components analysis (PCA) was used to cluster questionnaire responses, from which commonly defined personality traits could be defined. 'Trait scores' were defined for each dog by averaging the total score for each of the questions deemed significantly loaded by PCA. Behaviours which significantly differentiated between the 20 dogs with the highest and the 20 dogs with lowest trait scores were identified , using the Wilcoxon-Mann-Whitney test for two independent groups. The number of key traits indicating behaviours displayed by dogs was correlated with trait scores, Spearman Rank correlation coefficients were calculated.

Results

1.Derivation of temperament traits..

Principal components analysis revealed that questionnaire responses corresponded with 5 commonly defined personality traits: Aggression, Excitability, Timidity, Obedience and separation related behaviour. Some of the scores for different traits corresponded significantly with each other, although in most cases the Spearman correlation coefficients were extremely small. The most notable positive correlation was between 'excitability' and 'separation' scores (Rho=0.44, $p<0.001$). This infers that most excitable dogs were significantly more likely to be destructive and to vocalise when left alone. However, because of the high incidence of both boisterous behaviour and separation anxiety in abandoned dogs, the correlation coefficient was sufficiently low to justify regarding the two traits separately. This was therefore, mainly an oblique solution.

Variable	Principal component			
	1		2	
	% of total variance explained	Eigenvalue	% of total variance explained	Eigenvalue
Aggression	37.43	7.861	12.72	2.67
Excitability	37.61	7.145	9.67	1.837
Timidity	35.71	3.571	16.13	1.613
Obedience	35.23	2.818	14.02	1.112
Separation	42.59	3.407	17.98	1.438

Table 1. The percentage of variance explained by the principal components 1&2 for the five sections

2. Validation of the temperament tests.

Certain key behaviours displayed in the tests in the shelter significantly differentiated between high and low trait scoring dogs, (Wilcoxon-Mann-Whitney, $p<0.05$), ie. during testing, some of the displayed behaviours were indicative of high trait scorers and some were indicative of low trait scorers. Another good predictor of trait was found to be how many of these key behaviours were displayed during testing. The following table describes the tests which were performed and the highest Spearman correlation coefficients between the number of behaviours which were displayed during testing and trait score.

	Temperament trait									
	Aggression		Excitability		Timidity		Obedience		Separation	
Test	Rho	p	Rho	p	Rho	p	Rho	p	Rho	p
1 Stare at dog	0.533	***	0.524	***	0.447	**	0.530	***	0.555	***
2.Enter kennel	0.453	**	0.623	***	0.534	***	0.518	**	0.351	*
3.Ignore dog	0.530	***	0.640	***	0.563	***	-0.425	**	0.321	*
4.Stroke dog	0.616	***	0.601	***	0.412	**	0.190	NS	0.367	*
5.Ignore dog	0.500	**	0.348	*	0.574	***	-0.500	**	0.236	NS
6.Phys.inspec.	0.476	**	0.646	***	0.478	**	0.493	**	0.501	**
7*Groom	0.523	***	0.659	***	-0.271	NS	-0.440	**	0.634	***
8.Leave kennel	0.538	***	0.555	***	-0.403	**	0.354	*	0.269	NS
9*Show lead	0.821	***	-0.517	**	-0.585	***	-0.727	***	-0.188	NS
10*Lead on	-0.317	NS	0.463	**	0.679	***	0.569	***	-0.271	NS
11*Walk on lead	-0.294	NS	-0.298	NS	0.546	***	0.394	*	0.387	*
12.Livestock test	0.650	***	0.542	***	0.650	***	0.479	**	-0.625	***
13.Go thru gate	-0.133	NS	0.061	NS	-0.192	NS	0.202	NS	-0.442	**
14.Novel enclos.	0.567	***	0.498	**	0.573	***	0.542	***	-0.391	*
15.Recall	-0.383	*	-	-	0.350	*	-0.362	*	0.581	***
16.Retrieve	-0.380	*	0.418	*	0.446	**	0.387	*	-	-
17*Tug of war	-0.815	***	-0.348	*	0.415	**	0.360	*	-0.194	NS
18.Unfam.dog	0.481	**	0.235	NS	-0.582	***	0.621	***	-0.570	***
21.Umbrella	-0.656	***	0.452	**	-0.382	*	0.333	*	0.309	NS
22.Threat by RL	0.585	***	0.715	***	0.553	***	0.613	***	0.570	***
24*Offer titbit	0.740	***	-0.580	***	-0.793	***	0.572	***	0.724	***
25.Food arrival	0.248	NS	-0.291	NS	0.685	***	-0.550	***	-0.455	**
26.Remove food	0.648	***	0.478	**	0.270	NS	-0.422	**	0.361	*

Table 2. The relationship between trait and the behaviours indicating those traits, (only the highest Spearman Rank Correlation Coefficients are shown. See text for further explanation.).(Significance levels: NS $p>0.05$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$).

One hour is a longer than acceptable time for most kennel staff to spare to test a dog.Therefore, a streamlined sequence of tests have been selected for further validation. These tests were selected from the initial pilot study above, according to which provided the best predictions of dog behaviour in the home, which tests were the least difficult to perform and also according to the amount of stress that they may have caused the animal. For example, assessing the reactions of dogs to cats, was not included in the streamlined sequence of tests, because during the pilot study one greyhound was attacked and injured by one test cat. Also, in other cases, the test cats appeared stressed by the presence of the more reactive dogs. The test which involved the dog meeting a child was also abandoned, because in many instances, no child was available to test with. Also, the character of the child and its acceptable proximity to thee dog in each case was too variable to be standardised. These were considered adequate reasons for elimination from the streamlined series of tests. On this basis, the temperament tests in table 2 marked with an asterisk were those selected for for a further detailed validation using a much larger sample size of dogs and owners. These tests are currently undergoing validation. Before these 7 tests are recommended for use it is necessary to ensure that their predictive value had not arisen due to order effects when performed with the other 19 tests.

Discussion

The results of this pilot study have revealed that temperament testing dogs in rescue shelters can give a characterisation of the type of behaviour dogs will display in their new home. The analysis of owner questionnaires using PCA revealed at least 5 temperament traits in dogs. The first principal component for aggression accounted for 38% or the variance of all of the questions included in the analysis, ie. the incidence of aggressive behaviour was positively correlated between all 21 scenarios in which owners were questioned, (including aggression towards people, other dogs, being groomed, the removal of toys and food), except for 3 questions which were omitted from the analysis because the situation had rarely been encountered, (these included the interaction of other dogs from the same household and the sexual mounting of dogs and people). Some forms of aggression were not applicable to this study and therefore not included, for example, maternal aggression. All of the situations elicited commonly correlated responses, but not necessarily the same response. These results support O'Farrell, (1987) who describes most forms of aggression as variants of dominance aggression. This is also comparable with Hart & Hart's study, (1984) which revealed an aggressiveness factor when 13 behavioural 'traits' were factor analysed.

Every question about dog timidity was positively loaded in the first component, suggesting that there is a general timidity trait which mediates most situations in which dogs display timidity. The same was also true for excitability, which suggests that there is also a general excitability trait which mediates in the situations where dogs become excitable. This is comparable to Hart and Hart' reactivity trait, which also included excitability, excessive barking and general activity. All obedience questions involving the responses of dogs to direct commands by the owner were positively loaded in the first Principal component, apart from situations in which the dog would chase cats or cyclists, these questions received a low response and therefore were omitted from the analysis. Finally, vocalising, destructive behaviours, urinating and defeacating were all positively loaded together in the first Principal component, for questions concerned with how dogs responded to being left alone. This section was positively correlated with excitability, suggesting that the most excitable dogs were significantly more predisposed to display 'separation anxiety'. However, the correlation coefficient was sufficiently low to justify regarding the two traits separately , so facilitating a more precise prediction of both. Understanding the structure of dog personality has revealed that it may be possible to conduct fewer temperament tests to predict fewer traits, than attempting to predict many individual behavioural problems using more highly specific tests.

Most of the temperament tests revealed a significant correlation with the traits identified from the PCA. Dogs may display aggression when they feel that their dominance over a resource is being threatened. Most of the tests involved an unfamiliar tester encroaching into what the dog could perceive to be its' territory or an attempt to remove something from the dog. An aggressive response is therefore likely. Excitability scores were also highly correlated with most of the temperament tests. Rescue shelters are generally barren and unstimulating environments. It is likely, therefore, that any disruption that testing may have caused will have provoked interest and excitement in to what is otherwise an unstimulating situation. It is interesting to note that the response elicited by the tester leaving the dogs kennel was not significantly correlated with separation anxiety scores, but was correlated with excitability scores. Timidity was particularly well correlated with putting a choke chain over the dogs head(test 10). In this situation the tester attempts to approach and touch the dog whilst standing over it; the combination of these appears to elicit a particularly fear related response.

Conclusions

The results of this pilot study have revealed that temperament testing dogs in rescue shelters can effectively characterise the type of behaviour dogs will display in their new home. Temperament tests, however, are unlikely to be 100% effective. Homing dogs successfully with new owners also relies greatly on the careful assessment of the prospective owners and the demographics of their household, as well as a better understanding of the mechanisms involved in owner and dog computability. This may reduce the numbers of dogs which are returned to shelters after homing because of mis-match, as well as enhancing the positive effects associated with pet ownership.

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